

ARMY ORDNANCE ROCKET RENOVATION
PROJECT

TWENTIETH INTERMEDIATE REPORT
OF THE
COMMITTEE ON EXPENDITURES IN THE
EXECUTIVE DEPARTMENTS¹



DECEMBER 18, 1952.—Committed to the Committee of the Whole House
on the State of the Union and ordered to be printed

UNITED STATES
GOVERNMENT PRINTING OFFICE

WASHINGTON : 1952

COMMITTEE ON EXPENDITURES IN THE EXECUTIVE DEPARTMENTS¹

WILLIAM L. DAWSON, Illinois, *Chairman*

CHET HOLIFIELD, California
HENDERSON LANHAM, Georgia
PORTER HARDY, Jr., Virginia
FRANK M. KARSTEN, Missouri
JOHN W. McCORMACK, Massachusetts
HERBERT C. BONNER, North Carolina
JOHN A. BLATNIK, Minnesota
HAROLD D. DONOHUE, Massachusetts
M. G. BURNSIDE, West Virginia
RICHARD BOLLING, Missouri
JOHN F. SHELLEY, California
W. J. BRYAN DORN, South Carolina
SIDNEY A. FINE, New York
WILLIAM C. LANTAFF, Florida
WALTER S. BARING, Nevada

CLARE E. HOFFMAN, Michigan
R. WALTER RIEHLMAN, New York
CECIL M. HARDEN, Indiana
GEORGE H. BENDER, Ohio
CHARLES B. BROWNSON, Indiana
THOMAS B. CURTIS, Missouri
MARGUERITE STITT CHURCH, Illinois
GEORGE MEADER, Michigan
WILLIAM E. McVEY, Illinois
ALVIN R. BUSH, Pennsylvania
FRANK C. OSMERS, Jr., New Jersey

CHRISTINE RAY DAVIS, *Chief Clerk*
THOMAS A. KENNEDY, *General Counsel*
WILLIAM A. YOUNG, *Staff Director*

GOVERNMENT OPERATIONS SUBCOMMITTEE

PORTER HARDY, Jr., Virginia, *Chairman*

RICHARD BOLLING, Missouri
JOHN F. SHELLEY, California
WILLIAM C. LANTAFF, Florida
WALTER S. BARING, Nevada

R. WALTER RIEHLMAN, New York
GEORGE H. BENDER, Ohio
GEORGE MEADER, Michigan

MICHAEL P. BALWAN, *Staff Director*
WILLIAM A. BREWER, *Counsel*

¹ Name changed to Committee on Government Operations, July 4, 1952.

LETTER OF TRANSMITTAL

HOUSE OF REPRESENTATIVES,
Washington, D. C., December 18, 1952.

Hon. RALPH R. ROBERTS,
Clerk of the House of Representatives,
Washington, D. C.

DEAR MR. CLERK: I submit herewith the twentieth intermediate report of the Committee on Expenditures in the Executive Departments.¹

WILLIAM L. DAWSON, *Chairman.*

¹ Name changed to Committee on Government Operations, July 4, 1952.

LETTER OF TRANSMITTAL

Hon. James H. Eastman,
Director, U. S. Bureau of Investigation,
Washington, D. C.

Dear Mr. Eastman: I enclose herewith the transcript of the report of the Committee on Japanese in the Executive Department.

Very respectfully,
William A. Dawson, Chairman.

This document is classified "Confidential" under Executive Order 12958, dated 5-8-76.

Union Calendar No. 791

82D CONGRESS
2d Session

HOUSE OF REPRESENTATIVES

REPORT
No. 2504

ARMY ORDNANCE ROCKET RENOVATION PROJECT

DECEMBER 18, 1952.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

Mr. DAWSON, from the Committee on Expenditures in the Executive Departments,¹ submitted the following

TWENTIETH INTERMEDIATE REPORT

[Pursuant to H. Res. 736 (July 4, 1952), 82d Cong.]

On December 18, 1952, the Government Operations Subcommittee, of which Congressman Porter Hardy, Jr., is chairman, submitted a report on Army Ordnance rocket renovation project.

In accordance with permission granted by the House on July 4, 1952, Chairman William L. Dawson submits the twentieth intermediate report of the committee.

INTRODUCTION

In the course of its work the subcommittee receives many complaints and allegations about the awarding of defense contracts, and about the qualifications and performance of defense contractors. Many of these complaints are without reasonable foundation, and in some cases commendation is more appropriate than criticism. However, many mistakes have been made in the past and many will be made in the future. This subcommittee does not contend that perfection can be achieved in military contracting, but it does believe in the importance—even urgency—of detecting errors as promptly as possible and it insists that they be corrected—not hidden. Moreover, we believe that prompt corrective action, taken in an open and forthright manner, can accomplish much in the saving of time, money, and critical materials. Administrative personnel, whether civilian or military, who ignore or cover up the facts in an effort at face-saving are unworthy of positions of trust or responsibility.

The following is an account of an ill-advised contract where the mistakes were—or should have been—obvious long before actual performance began. This case is an example of an effort to hide rather than admit error, and it recounts some of the wasteful and extravagant expenditures which ensued.

¹ Name changed to Committee on Government Operations, July 4, 1952.

In the fall of 1950 the Ordnance Corps had on hand a large quantity of 2.36-inch rockets manufactured during World War II. This is the infantry rocket fired from the shoulder-held launcher called the bazooka. The rocket is propelled by the rapid burning of a propellant charge inside a short length of steel tubing, the propellant gases being expelled through a jet at the rear of the rocket. This motor tube of the rocket in which the propellant charge is burned must be able to withstand high, almost explosive internal pressures. To guard against failure of the tube on firing, which could seriously injure the soldier firing the bazooka, Army procedure requires rigid testing.

Many of the World War II motor tubes were made of low-carbon steel. Before assembly into the rocket each of these tubes was hydraulically tested to withstand an internal pressure of 12,000 pounds per square inch. Since the last war improved propellant and explosive charges have been developed and mechanical improvements have been made.

For some time the Ordnance Corps had been considering renovating the World War II rockets. One difficulty lay in raising the strength of the motor tubes to withstand test pressures of 22,000 pounds per square inch, which gives a 50-percent safety margin above the firing pressure of 14,600 pounds per square inch. This might be done by heat-treating the tubes, about 1,500,000 of them. Successful renovation of the tubes would be about \$3 cheaper per tube than buying new alloy steel tubes. There would also be a saving of about 1,000,000 feet of alloy steel tubing, which has been in extremely short supply.

But heat-treating the tubes raised certain difficulties. At the fore-end of the tube there is a plug which is brazed in with silver solder. The temperature required to heat-treat the tube would melt the silver solder and cause a defective joint. In the fall of 1950 a company with experience in heat treating and rocket research proposed to the Ordnance Corps a method of heat-treating the motor tubes. This company was the H. F. Holden Co. of Detroit, Mich., and New Haven, Conn.

The Holden company proposed to disassemble the plugs from the tubes, replace the silver solder with another metal having a higher melting point than the temperature of the heat-treating process, rebraze the plugs into the tubes, and then heat-treat the tubes in a furnace having a controlled gaseous atmosphere which would increase the carbon content of the metal.

The Holden company reheat-treated some sample lots which were tested by Picatinny Arsenal. These tests convinced the Ordnance Corps that salvage of the tubes was feasible. On December 19, 1950, Ordnance Corps headquarters in Washington recommended to the Ordnance Ammunition Center in Joliet, Ill., that immediate action be taken to salvage all the low-carbon steel rocket motor tubes by the heat-treatment process developed by the Holden company or an equivalent.

On February 2, 1951, the Ordnance ammunition center instructed the commanding officer of the Milan Arsenal at Milan, Tenn., to negotiate with commercial concerns to modify the tubes. Some of these tubes did not require reheat-treating, as they were of fairly recent manufacture and made of alloy steel. These would require only mechanical modification and the Ordnance ammunition center recommended that Milan Arsenal make one contract to cover this work. It was also recommended that a second contract cover the

tubes which would require both reheat-treating and the mechanical modification. The instructions stated:

Your negotiation for this particular phase of the work will require that the prospective contractor prove his heat-treating process by submission of treated samples to Picatinny Arsenal for tests and by proving ground tests, prior to award of a contract and without cost to the Government. Also, reworked stabilizer tubes in this group must be hydrostatically tested twice by the manufacturer, 48 hours apart, instead of once as now required by specification. The heat-treating process developed by the Holden company has been already proven in this regard.

A young Ordnance Corps officer, stationed at Milan Arsenal, was authorized to find prospective contractors for the work. Among the potential contractors he consulted was a reputable manufacturer of electric fans, the Hunter Fan & Ventilating Co. of Memphis, Tenn. This company appeared to be well qualified to accomplish the mechanical renovation of the rockets. The Hunter company had no experience in heat-treating, an important step in the renovation process from the metallurgical viewpoint.

The Ordnance Corps officer is understood to have had some personal experience in heat treating by induction. In this method the metal to be heated is placed inside an electrical coil. High frequency electricity passing through the coil induces high temperatures in the metal in a matter of seconds. He went to a manufacturer of induction-heating equipment and in its laboratory reheat-treated some of the tubes by induction methods. Preliminary tests indicated that the tubes would respond to this type of heat treatment. He took 12 of these to Picatinny Arsenal for hydraulic testing at the required pressure of 22,000 pounds per square inch inside the tube. In some cases the plugs blew out of the tubes. In every case that the plug held, the tube was fractured by the internal pressure.

The officer was still not convinced that the process was not practical. At Government expense he bought a special induction coil with which he conducted more experiments at Milan Arsenal. The results led him to believe that the method was practical. He kept no record of his experiments.

The Hunter company was aware of these experiments. On the basis of them it proposed to do both the mechanical modification and the reheat treating. If the induction method would work it would be much cheaper than the method proposed by the Holden company because it would not be necessary to disassemble the plugs from the tubes, rebraze the joints, and heat the tubes in a furnace for a relatively long period of time. Without disassembly, a tube could be placed in a coil and treated in a matter of seconds.

Bids were obtained from the Holden company, the Hunter company, and a third company. The bid of the Holden company was considerably higher than that of the Hunter company. Ordnance personnel testified that this was caused in part by the fact that the Holden company, although skilled in heat treating, did not have the metalworking experience of the Hunter company, and in part by the longer, more involved heat-treating process proposed by the Holden company. The proposals were:

<i>Phase I (machining only):</i>	
Holden company-----	\$845, 856
Hunter company-----	343, 720
<i>Phase II (heat treating and machining):</i>	
Holden company-----	1, 955, 018
Hunter company-----	1, 192, 260

The rocket experts in the Pentagon, civilians, were apprehensive that the contract might be awarded to a company with no heat-treating experience. They initiated a teletype to the Ordnance Ammunition Center on February 2, 1951, reading in part:

Rockets for training and combat necessitate only best qualified proven contractor be assigned this critical work * * *

On February 7, 1951, another message was sent to Milan Arsenal. It read:

Due to critical nature of proved heat-treatment process necessary to pass double twenty-two thousand pounds per square inch hydrostatic test * * * low carbon steel motors and urgent need for renovated rockets to using services extremely important that chosen contractor has developed proven heat-treating cycle to salvage these low carbon motor tubes and can pass double twenty-two thousand pounds per square inch hydrostatic test. * * * *Under no circumstances should contract be placed with unreliable contractor who has not indicated positive proven results to pass necessary tests. * * * Urgent requirements for these rockets to replace outmoded M6A3.* [Emphasis supplied.]

In light of these instructions it may have been the course of common sense to award a contract for heat-treating the tubes to a company experienced in heat-treating, and to award another contract for machining the tubes to a company experienced in machining. The Hunter company did not have a positive, proven heat-treating process. Nevertheless, the Ordnance officer appeared before a special session of the awards board at the Ordnance Ammunition Center on March 8, 1951, to state that he had personal knowledge of the facilities and ability of the Hunter company to perform and that he considered it to be satisfactory and well qualified. The awards board recommended award of a contract to the Hunter company, and on March 13, 1951, a contract was made.

The contract was in two parts. One part called for machining 500,000 tubes. This part of the contract was executed to the satisfaction of the Ordnance Corps. The other part called for first reheat-treating and then machining 1,500,000 tubes at \$0.7782 each, a total of \$1,167,300. The contract required the company to furnish a pilot lot to Picatinny Arsenal for testing on or before August 1, 1951. Quantity production would not be initiated prior to approval by the arsenal. The contract called for completion of all the work before August 1, 1952.

In November 1951, after this subcommittee had begun its inquiries, the pilot lot promised for August 1, 1951, had not yet been shipped to Picatinny Arsenal. Representatives of the arsenal had visited the company in August to learn the reasons for the delay. By this time the Ordnance officer who had handled the letting of the contract had been transferred to Joliet. He was ordered to Memphis to expedite production of the pilot lot which was finally shipped to Picatinny Arsenal on December 13, 1951. This pilot lot failed to pass the tests.

On January 17, 1952, a civilian assistant to the Chief of Ordnance wrote to the commanding general of the Ordnance Ammunition Center stating:

Information in this office indicates that stocks of subject rockets are virtually depleted. Requests for this type of ammunition from combat using services cannot be filled since existing stocks are completely exhausted.

He reviewed the delay in production by the Hunter company and concluded with a question as to—

how soon production loading schedules can be met in order that the funds and materials are not lost and the using combat services requests for this type of ammunition can be filled.

In April 1952 the contractor submitted a second pilot lot to Picatinny Arsenal for test. This lot, too, failed to pass the test.

On May 5, 1952, Maj. Gen. E. L. Ford, Chief of Ordnance, in a letter responding to a letter from the chairman of the subcommittee, reviewed the difficulties of the program. He stated:

As for the heat treatment, the 22,000-pounds-per-square-inch pressure test puts a severe stress in the motor and the heat treatment must be of the very best quality, otherwise failure or distortion will occur. This severe test is required in order to insure that the rocket will safely withstand the firing stresses. This is essential because this rocket is fired from a shoulder launcher and a motor failure would probably result in death or serious injury to the soldier firing the rocket.

In reference to the first pilot lot produced by the contractor, General Ford stated:

Of particular concern to the Ordnance Corps was the arsenal's report on the metallurgical examination of the motors. The examination showed that the heat-treatment procedure did not produce a satisfactory metallurgical structure.

He said:

Information revealed at a special conference in this office indicates that there is a strong probability that the contractor now has discovered the weakness in his method and with a simple modification of procedure may be able to produce successfully.

The special conference referred to, took place in the Pentagon on April 30, 1952, and among those present was the Ordnance officer who had played a principal part in this whole matter. He had again been sent to Memphis and had returned with the surprising discovery that 85 percent of the tubes were not low-carbon steel after all, but were alloy steel, which would be easier to reheat-treat. He reported also that the contractor was disassembling the plugs from the tubes and rebrazing them with a metal having a high melting point. This, of course, was one of the major steps in the method originally proposed by the Holden company. It would appear that this is what General Ford refers to in saying, "the contractor now has discovered the weakness in his method."

A third pilot lot was submitted to Picatinny Arsenal in May 1952. The same Ordnance officer had again been sent to Memphis to expedite or supervise production of the lot. Instructions from the civilian experts in the Pentagon were that this lot be composed of mixed alloy steel and low-carbon steel motors. Despite these instructions (if not actually in deliberate contravention) it appears that all of the tubes submitted for test were of the more easily treated alloy steel. The pilot lot submitted to Picatinny Arsenal may have been hand-picked in an effort to pass the test, rather than to assure satisfactory performance of the rockets ultimately to be renovated. This lot passed the Picatinny Arsenal tests and the company was given permission to initiate quantity production. However, no metallurgical examination was made of the tubes to determine if the metal was of good quality. It will be recalled that General Ford said of the first pilot lot, which was examined metallurgically:

The examination showed that the heat-treatment procedure did not produce a satisfactory metallurgical structure.

On September 18, 1952, in executive session, the subcommittee heard testimony on the rocket-renovation program. It was revealed that although 41,000 tubes were to have been completed by August 31, 1951, a year later that many had not been shipped. The subcommittee was assured that the contractor would soon reach the peak production rate, which originally was to have been reached April 1, 1952. It was also learned that the original contract price of \$0.7782 per tube had been raised to \$1.0058 per tube.

The subcommittee was assured by the Ordnance Corps that the contractor had now developed a successful reheat-treating process and all was now well, but the testimony was so ambiguous and conflicting that it was decided to send a staff member of the contractor's plant and Milan Arsenal to ascertain the facts.

The findings of the on-the-spot investigation raised serious doubts about the course being pursued by the Ordnance Corps. Picatinny Arsenal had approved quantity production by the contractor upon condition that the finished tubes meet a 6-percent elongation test. In this test a strip is cut from a sample tube and stretched until it breaks. It must stretch 6 percent, or twelve one-hundredths of an inch, before breaking. This test (in addition to the hydrostatic test) was intended to detect and eliminate tubes which are not sufficiently ductile and elastic to withstand the shock of firing the propellant charge.

The Ordnance Corps has engaged a well-known commercial testing laboratory to conduct these tests under the supervision of an Ordnance Corps inspector. A sample from each production lot of 20,000 tubes is submitted to the laboratory. This sample consists of 6 strips of metal cut from 3 tubes taken at random from the 20,000. Examination of the records of the testing laboratory showed that the first six lots submitted had passed within the definitions of the test with average elongation values running from 6.25 to 6.90 percent.

However, on lot No. 7 the technician's work sheet bore the notation, "two lots failed." It was discovered that the first sample submitted had failed. Standard Ordnance Corps testing procedures provide that when the first sample of a material under test fails, the size of the second sample must be double that of the first. The failure of the first sample casts doubt on the lot under test and extra care must be taken to detect the defective material.

After the failure of the first sample of lot No. 7, normal procedure would call for the second sample to consist of 12 strips cut from 6 tubes, a number twice that of the first sample. Instead, six strips cut from three tubes were again submitted. This sample also failed. One strip snapped after stretching only 1½ percent, another after only 2 percent, an indication that the metal was extremely hard and brittle.

A third sample of six strips from three tubes was tested. This sample passed with an average elongation of 7.75 percent, the highest test average yet obtained. Only the result of this successful test was formally reported to the contractor and the Ordnance Corps, although a subcommittee representative was told that the contractor's manager and the arsenal's chief inspector had been verbally advised of the failure of the first two samples tested. The whole lot of approximately 20,000 tubes was then formally approved for the further individual hydrostatic test before being shipped to Milan Arsenal.

The Ordnance Corps places major reliance on the 22,000-pounds-per-square-inch hydrostatic test which the contractor applies twice to each tube.

It was also learned from the chief engineer of the contractor that one step of the renovation process, rebrazing, was actually removing carbon from the steel. This is known as decarburizing and has a definite weakening effect. To counteract it Ordnance had authorized the company to buy at Government expense—about \$10,000—a device to change the atmosphere of the brazing furnace. Delivery of the device could not be made for 3 to 4 months. In the meantime production of the tubes continued without it.

Samples of the reheat-treated tubes were taken by the staff member and submitted to an examination by metallurgists of the National Bureau of Standards. Their examination of the microstructure of the steel confirmed that extensive decarburization had taken place. It was also obvious that the heat treatment was not of the very best quality, as General Ford had stated to the chairman it must be.

In the first week of October the chairman of the subcommittee discussed this situation with Secretary Pace. The chairman pointed out that, according to his understanding of the sampling and testing procedures which were being used, inevitably all of the reheat-treated tubes would pass the elongation test and that there is a possibility that some bad tubes have already passed.

As a secondary consideration it was called to Mr. Pace's attention that the Ordnance Corps is paying about \$5,000 a day for this renovation work, and has no accurate idea about whether the finished product is acceptable.

Mr. Pace agreed that the situation warranted close scrutiny by the Army, and instructed the Department counselor to examine all the facts and to take any steps necessary. The counselor decided to appoint a panel of three experts in the field of metallurgy to appraise the contractor's performance. They are Mr. Howard L. Miller, Republic Steel Corp., Cleveland, Ohio; Dr. Elbert Rowland, Timken Roller Bearing Co., Canton, Ohio; Dr. George Sachs, Syracuse University, Syracuse, N. Y.

This panel did not meet until November 14, over a month after the Secretary of the Army had ordered an investigation. At this meeting the experts were presented with the facts and problems. Meanwhile the Army had ordered that none of the tubes be issued pending the report of the panel.

These experts went to the contractor's factory on November 19 and inspected the process. Samples were taken for laboratory analyses. By the time they arrived on the scene the company had processed about 140,000 more tubes at a cost of over \$140,000.

On December 12 the panel met to discuss the laboratory findings. The experts unanimously agreed that although the heat-treatment procedures now being employed are deficient, the tubes produced might be acceptable. They suggested modifications of the process which the Army is putting into effect. It was also learned at this meeting that the original specifications set by Picatinny Arsenal called for ring-gaging each tube to detect excessive distortion caused by the high internal pressures of the hydrostatic tests. According to the original specification any tube which bulged more than fourteen one-thou-

sandths of an inch was unacceptable. This specification had been omitted, either by the Ordnance Ammunition Center or Milan Arsenal.

Ring-gaging each tube (which was the policy in effect immediately prior to this renovation program) is not being done. The tolerance had been raised to thirty one-thousandths of an inch. Only tubes with *visible* bulges are being gaged, and not with a ring gage, but with a feeler gage.

At the instance of the panel experts, firing tests were ordered to determine whether the bulge caused by the hydrostatic tests had weakened some tubes to such an extent that they might be unsafe and have to be discarded. The subcommittee understands that the panel will meet again subsequent to the completion of these firing tests and render an opinion concerning the safety of the tubes which have already been renovated.

The situation was brought to Secretary Pace's attention in early October—nearly 3 months ago. Meanwhile the contractor is permitted to continue production of the reheat-treated tubes, the serviceability of which is still unknown. American taxpayers are continuing to spend about \$5,000 a day on this dubious procedure.

CONCLUSIONS AND OBSERVATIONS

1. Despite instructions formulated by qualified Ordnance Corps personnel, an Ordnance officer made a contract with an inexperienced company which did not demonstrate ability to perform.

2. By February 1952, responsible officers of the Ordnance Corps were aware that the contractor was not qualified and that satisfactory performance on the rocket-renovation contract was doubtful. The contractor was allowed to experiment over a period of months, and was pronounced qualified only after a third lot was produced under the direct supervision of the Ordnance Corps.

3. After the contractor went into quantity production, elongation tests of the tubes were improperly conducted. Standard Ordnance Corps procedures for this test were either ignored or misinterpreted to the point that results were unreliable if not actually valueless. Only time and further tests will tell whether these tubes can safely be used for firing or whether they may have to be scrapped.

4. It is the opinion of the subcommittee that shortly after award of this contract top officers of the Ordnance Corps realized that a mistake had been made. Notwithstanding that, they were determined to vindicate the Ordnance Corps by making the contractor successful—or apparently so—regardless of the cost in time or money.

5. The investigation of this program ordered by the Secretary of the Army provides some reassurance to the subcommittee. It appears that this will be a thorough study by competent people. From a financial standpoint the subcommittee hopes that the rocket tubes which have already been processed will be found serviceable. However, in the opinion of the subcommittee, such an outcome would be nothing but luck and not the result of a well-conceived program properly carried out by the Ordnance Corps.